CLAIMS

1. A color system comprising an image capture device for capturing a scene and for providing first color image data representative thereof, a color transformer coupled to the image capture device for transforming the first color image data to second color image data, a first display device coupled to the color transformer, the first display device for displaying the scene as represented by the second color image data; the system characterized by the color transformer including a processor programmed to perform a matrix operation upon the first color image data by selecting matrix elements from a look up table comprising pre-computed values.

2. The color system of claim 1 wherein said color transformer is further characterized by operating on the first color image data (R,G,B) so as to provide second color image data (R'G'B') in accordance with the relationships:

R'= Mrr * Lr(R) + Mrg * Lg(G) + Mrb * Lb(B)

G'= Mgr * Lr(R) + Mgg * Lg(G) + Mgb * Lb(B)

B'= Mbr * Lr(R) + Mbg * Lg(G) + Mbb * Lb(B)

wherein R is a red value of said first color image, G is a green color value of said first color image, B is a blue color value of said first color image, M is a matrix operation and L is a look up table operation carried out upon red (R), green (G) and blue (B) .

3. The color system of claim 2 wherein said color transformer is further characterized by values of R, G and B ranging between a minimum and maximum digital value.

4. The color system of claim 2 wherein the color transformer is further characterized by values of Lr(R), Lg(G) and Lb(B) ranging between maximum and minimum digital values.

5. The color system of claim 1 wherein said transform is further characterized by a processor programmed to operate on R, G and B values to provide transformed values R', G' and B' in accordance with the relationship:

R'= Mrr(Lr(R)) + Mrg(Lg(G)) + Mrb(Lb(B))

G'= Mgr(Lr(R)) + Mgg(Lg(G)) + Mgb(Lb(B))

B'= Mbr(Lr(R)) + Mbg(Lg(G)) + Mbb(Lb(B))

Wherein M is a matrix operation, Lr(R) is a Red look up value, Lg(G) is a green look up value and Lb(B) is a blue look up value.

6. The color system of claim 1 wherein said processor is further characterized by a 3X3 matrix operation.

7. A color image processing method comprising the steps of capturing and storing a digital color image, transforming said captured digital color image based upon characteristics of a selected capture device, processing said transformed captured color image according to an appearance model, the method characterized by steps of transforming said processed transformed captured color image data based upon characteristics of a first selected display device having first display device characteristics and displaying said processed transformed captured color image data on a second selected display device having second display device characteristics.

8. The color image processing method of claim 7 characterized in that said first selected display device characteristics differ from said second selected display device characteristics.

9. A method for reproducing color images comprising the steps of capturing a color image with an image capture device, providing said captured color image to a first transform, said first transform generating device-independent output image color data the method characterized by the steps of forward adjusting said device independent output image color data based upon human perceptual characteristics to provide perceptually enhanced color image data, mapping said perceptually enhanced color image data in accordance with characteristics of an output device to provide color gamut mapped image data, performing a

reversing step of said forward adjusting step on said color gamut mapped image data to provide perceptually reversed color image data, and providing said perceptually reversed color image data to a second device transform, said second device transform being an inverse of said first device transform, said second device transform providing a reproduced image.

10. The method of claim 9 further characterized by steps of forward transforming said captured color image to provide device independent image data corresponding to said captured color image, forward adjusting said device independent image data based upon human perceptual characteristics to provide perceptually enhanced independent image data, gamut mapping the enhanced independent image data to provide gamut mapped image data, reversing the forward adjusting step for said gamut mapped image data step to provide perceptually reversed color image data, and reversing said forward transforming step for said perceptually reversed color image data to provide a color processed image.

11. A method for reproducing color images comprising the steps of capturing a color image with an image capture device, providing said captured color image to a first transform, said first transform generating device-independent output image color data, the method characterized by steps of forward adjusting said device independent output image color data based upon human perceptual characteristics to provide perceptually enhanced color image data, mapping said perceptually enhanced color image data in accordance with characteristics of an output device to provide color gamut mapped image data, performing a reversing step of said forward adjusting step on said color gamut mapped image data to provide perceptually reversed color image data, andproviding said perceptually reversed color image data to a second device transform, wherein said second device transform is an inverse of said first device transform, said second device transform providing a reproduced image.

12. A color processing method comprising the steps of capturing a color image, forward transforming the captured color image to provide device independent image data, forward adjusting the device independent image data based upon human perceptual characteristics to provide perceptually enhanced independent image data, gamut mapping the enhanced image data to provide gamut mapped image data, reversing the forward adjusting step to provide perceptually reversed color image data, and reversing the forward transforming step to provide a color processed image.

13. A color system for converting images into final color video images characterized by:

a first memory for storing at least one reference image having color characteristics corresponding to a first color appearance when said reference image is displayed on a reference display;

a second memory for storing at least one reproduced image having color characteristics corresponding to a second color appearance when said reproduced image is displayed on a target display;

a color processor coupled to said first and second memories, said color processor capable of automatically modifying color characteristics of said target image such said second color appearance substantially matches said first color appearance for a selected target display.